

Preface

EACH MORNING WE WAKE UP FROM A NIGHT OF SLEEP and in the evening fall asleep again for another night. This rhythm—so-called “circadian,” after the Latin words *circa diem* (“about a day”)—underlies a wide variety of human physiological functions, including sleep–wake cycles, body temperature, hormone secretion, locomotor activity, and feeding behavior.

Circadian rhythms are remarkably conserved over evolution. The cyclic movements of leaves on a plant, the activity of our house cat, and the morning singing of birds all follow a daily cycle that is natural and ancient. Studies over the past several decades have identified a plethora of cyclic behaviors, metabolic rhythms, and physiological oscillations that follow a circadian pattern. They occur in organisms as different as fungi, insects, unicellular protists, plants, cyanobacteria, vertebrates, and mammals. They are so pervasive that they encompass the gravitactic orientation of the photosynthetic flagellate *Euglena gracilis* as well as the social behavior of mammals in a group. Why are circadian rhythms so omnipresent? The answer is straightforward: These biological cycles are based on the most ancient feature of our environment, the astronomical rotation of Earth on its axis.

The field of circadian biology has had spectacular growth over the past two decades. Identifying the molecular wheels of the circadian clock paved the way to the discovery of a multitude of intriguing connections with cellular metabolism, homeostasis, the cell cycle, and organismal physiology. These connections have brought to the field a large number of colleagues from other areas of research, including aging, infectious diseases, cancer, and psychiatry.

This permeability across scientific fields has placed the circadian clock in a pivotal position within all aspects of systems biology. This was apparent at the 72nd Cold Spring Harbor Symposium on Quantitative Biology held in 2007, which focused on “Clocks and Rhythms” and brought together a highly diverse and yet complementary scientific community.

This book marks the 10th anniversary of that 2007 Symposium. It was conceived as a compendium highlighting some of the most intriguing directions in recent circadian research. Not every important aspect of circadian biology could be included. Yet it is our hope that the aficionados, as well as students just approaching the field, will find the book a stimulating guide to new insights into an ancient biological mechanism.

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